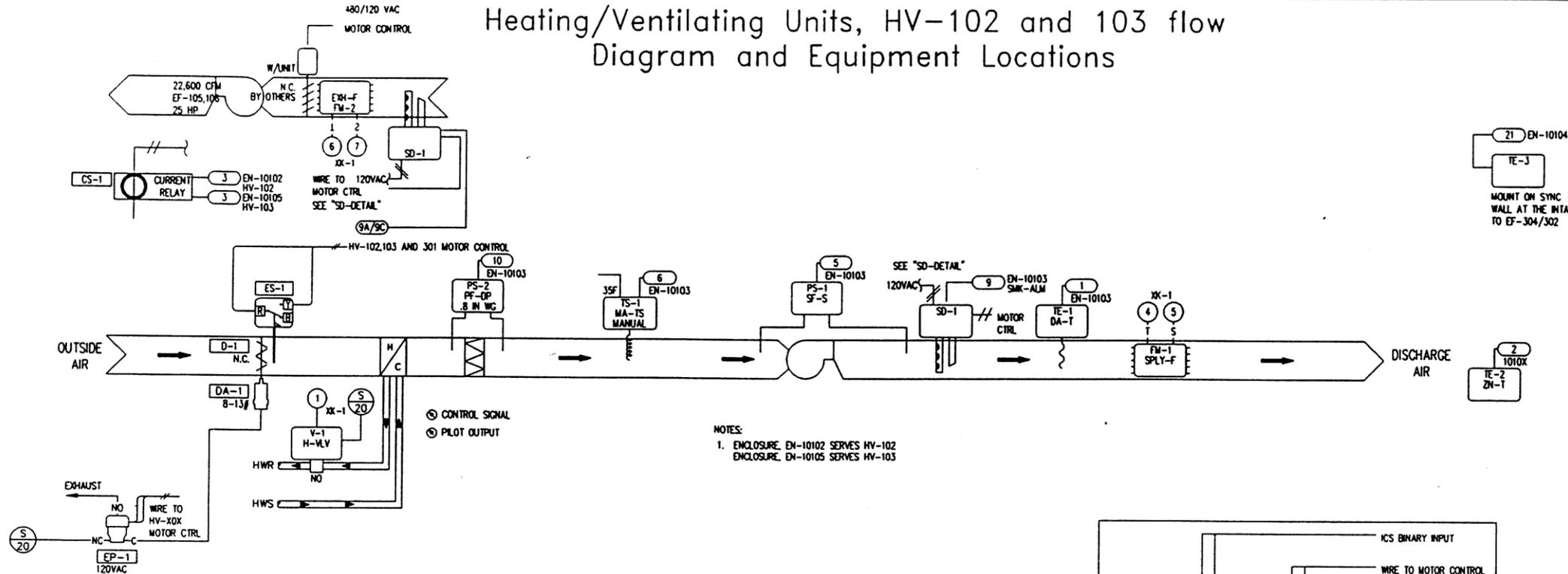
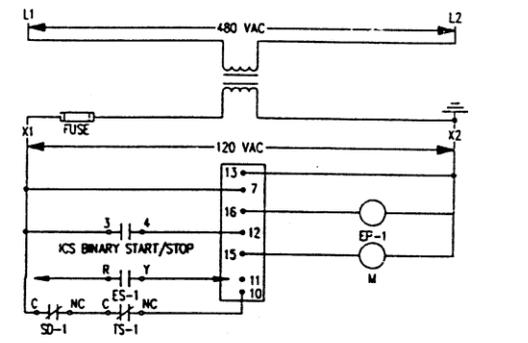
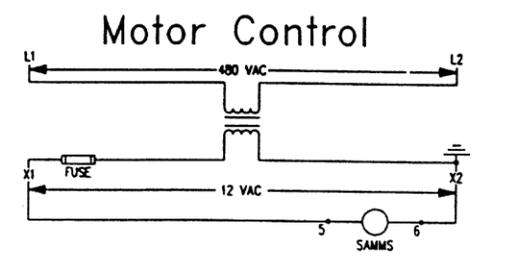


Heating/Ventilating Units, HV-102 and 103 flow Diagram and Equipment Locations



DEVICE TAG	QTY	CODE NUMBER	DESCRIPTION	FIELD MATERIAL
ACC	6	G-2010-5	AIR GAGE 1-1/2"	
D-1-D-2	---	---	SEE DAMPER SCHEDULE	
DA-1	---	---	SEE DAMPER SCHEDULE	
EP-1	2	V-2410-2	VALVE, SOL. AIR, 3-WAY	
ES-1	2	802T-CVP	END SWITCH-A/B	
FM-1-FM-2	4	DAWD	FLOW SWITCH-AMC	
TE-2,3	4	TE-6000-4	RTD	
	4	T-4000-2139	COVER	
	4	TE-6001-4	MOUNTING HARDWARE	
PS-1	2	P32AF-2C	SENSITIVE DIFF PRES CTL	
	8	FTG18A-600R	REMOTE WTD PROBE	
SD-1	4	841851AC-2	DUCT DETECTOR, ION,	
	4	ST-18	SAMPLING TUBE FOR	
TE-1	2	TE-6100-1	TEMP SENSING ELEMENT 17'	
TS-1	2	A70MA-1C	TEMP CONTROL 4 WIRE, 2-C	
V-1	---	---	SEE VALVE SCHEDULE	
CS-1	2	702-MD	CURRENT SWITCH-VERIS	

ANY MATERIAL WITH A (P) PRECEDING THE DEVICE TAG IS CONSIDERED PROPRIETARY EQUIPMENT AND IS BEING SUPPLIED BY JOHNSON CONTROLS, INC. ALL OTHER MATERIAL IS NON-PROPRIETARY EQUIPMENT.



Sequence Of Operations

SYSTEM: 100 Percent Outside Air Constant Volume Air Handling Unit
HV-102, HV-103

CONFIGURATION: Constant Discharge Air Setpoint
Constant air supply and exhaust fans

Discharge Air Temperature Setpoint

The building operating engineer will set the discharge air temperature by adjusting the discharge air setpoint. DA-SP form any ICS terminal. The digital controller will modulate controlled devices as described below to maintain a fan discharge temperature of 65 F. (adjustable at any ICS terminal)

Discharge Temperature Loop

The discharge cooling deadband is added to the discharge air setpoint. This value establishes the point at which mechanical cooling begins when the controller uses proportional only control. The digital controller will continually adjust the heating command according to the controller's result of the proportional-integral heating loop calculation. The digital controller will modulate the heating control valve, V-1, until the discharge air temperature equals the setpoint. The controller will provide an output between 0 and 100 percent as the discharge air temperature travels through the proportional bands.

Fans' Status

Sensitive differential pressure switches, PS-1 (supply fan) and PS-2 (exhaust fan) will close upon air flow being present, this will set fan status ON. The digital AHU controller switch to normal control.

Fan failure will be set if the binary feed back does not match the start/stop command or the discharge flow rate drops below 85 percent of the fan's design capacity.

Power Fail Restart

The power fail restart will delay the startup of the digital controller for 1 minute (adjustable at the operator workstation) after a power failure for controller reset condition. This logic will hold the controller in the shutdown mode until the restart timer has expired.

Electric low limit

Heating discharge low limit temperature switch, TS-1 will stop the supply fan, close the mixed air dampers and the AHU digital controller will issue an alarm to the ICS network in the event that the heating discharge temperature drops below 35 F. (Adj.)

Supply smoke detectors, SD-1 and SD-2 stop the supply or exhaust fan and the ASC controller will issue and alarm to the ICS network in the event the respective device senses smoke at the location.

Mixed air filter alarm

The mixed air filter condition will be monitored by differential pressure switch, PS-2. The switch will close in the event that the pressure drop exceeds .8 inches W.G. (adjustable) and an alarm will be sent to the ICS network. "Dirty Mixed air Filter"

Exhaust Control

The exhaust fans are interlocked in the following manner:

- EF-106 w/ HV-102
- EF-105 w/ HV-103

In the event that the respective supply fan fails, as sensed by sensitive differential pressure switches, PS-1 and PS-2, or analog air flow measuring stations, the digital controller will stop the associated exhaust fan.

The following point objects will be adjustable from any ICS terminal:

- Discharge air setpoint
- Heating lockout setpoint
- User start/stop time

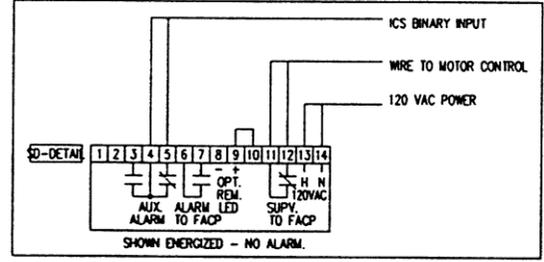
The following objects will be monitored/alarmed at an ICS terminal:

- Fan Discharge Air Temperature
- Filter Status
- Supply Fan Status
- Exhaust Fan Status, EF-105/106
- Smoke Detectors' Status
- Supply Air Flow Rate
- Exhaust Air Flow Rate

Loss of Air Flow

Upon loss of air flow as determined by sensitive differential pressure switch, PS-1 and the controlled devices will be commanded to the following states:

- Heating valve, V-1 will remain under control.



DRAWING TITLE		RECORD		FILE: HV-301	
Heating/Ventilating Units		6 GENERAL		DCODE: 199.30628.1210	
HV-102, 103 and 301		5 GENERAL		04/11/93 SF	
100 Percent Outside Air				10/22/92 SF	
Single Path Htg Unit				08/24/91 SF	
SALES ENGR	PROJECT MGR	APPL ENGR	DRAWN	APPROVED	DATE
5	SF	DCS	BY SF	DATE	11/21/91
PROJECT		JOHNSON CONTROLS		CONTRACT NUMBER	
The Argonne National Labs		3007 MALMO ROAD		91390-0009	
Advanced Photon Source Campus		ARLINGTON HEIGHTS		DRAWING NUMBER	
9700 Cass Avenue South		ILLINOIS 60035		91-9-B-03A	
Argonne, IL 60439		708/364-1500 Main			
		708/806-4438 Enq			